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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Kunzler & McKenzie 8 EAST BROADWAY SUITE 600 SALT LAKE CITY, UT 84111			EXAMINER WANG, BEN C	
			ART UNIT 2192	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/717,941	Applicant(s) BLINICK ET AL.	
	Examiner BEN C. WANG	Art Unit 2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 7, 9-26 and 28-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7, 9-26, and 28-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's amendments dated December 30, 2008, responding to the Office action mailed October 1, 2008 provided in the rejection of claims 1-7, 9-26, and 28-30, wherein claims 1, 3, 7, 9-10, 12-13, 20, and 28-30 have been amended and claims 31-35 are newly added.

Claims 1-3, 7, 9-26, and 28-35 remain pending in the application and which have been fully considered by the examiner.

Applicant's arguments with respect to claims currently amended have been fully considered but are moot in view of the new grounds of rejection – see APA (Applicant's admitted prior) and *Dmitriev* - art made of record, as applied here.

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Claim Rejections – 35 USC § 103(a)

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 7, 9, 10, 12-13, 20-22, 26, and 28-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talati (Pub. No. US 2004/0044997 A1) (hereinafter 'Talati') in view of Applicant's admitted prior art (paragraphs [006] – [007] hereinafter 'APA') and Mikhail Dmitriev (*Safe Class and Data Evolution in Large and Long-Lived Data Applications, University of Glasgow, Scotland, UK, March 2001, pp. 1-191*) (hereinafter 'Dmitriev' - art made of record)

4. **As to claim 1** (Currently Amended), Talati discloses an apparatus for updating a code image (e.g., Fig. 2), comprising:

a processor executing executable code stored on a storage device, the executable code comprising (e.g., Fig. 1, element 106 – Processor)

- a loader configured to load a new code image (e.g., [0014], lines 2-3; Fig. 2, element 102; [0047], lines 1-2) into a temporary memory location (e.g., Fig. 1, element 108; [0009], staging area) separate from a memory space (e.g., Fig. 1, element 110; [0009], line 2, runtime area) occupied by and used by an old code image (e.g., Fig. 2, elements 218, 110; [0046], lines 1-8; [0047], lines 1-2); and

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- a copy module configured to copy the new code image into the memory space occupied by the old code image (e.g., Fig. 2, element 202; Fig. 3, element 302; [0013], lines 1-3)

Further, Talati discloses a method and apparatus for downloading a new version of an executable code onto a system without the need to bring the system to a halt, thereby sacrificing system up time (e.g., [0005]) but does not explicitly disclose other limitations stated below.

However, APA discloses:

- a logic module configured to identify incompatibilities between the old code image and the new code image from a difference in initialization requirements (e.g., paragraphs [006], [007] on page 2 - ... changes in initialization processes for various hardware ...), and a difference in size and location between the old code image and the new code image (e.g., paragraph [007] on page 2 - ... changes in ... formats for data structures, parameters used to interact with other modules of a computer system, maintenance of persistent data, updating of other dependent code images, and the like ...);

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of APA into the Talati's system to further provide other limitations stated above in the Talati system.

The motivation is that the changes may be made to resolve resource conflicts, comply with updated communication protocols, resolve coding errors, and add improved functionality; failure to make these changes can cause the new code image to be

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incompatible with other software and hardware components of the computer system as once suggested by APA (e.g., paragraph [007] on page 2)

Furthermore, Talati and APA do not explicitly disclose other limitations stated below.

However, in an analogous art of *Safe Class and Data Evolution in Large and Long-Lived Data Applications*, Dmitriev discloses:

- a logic module configured to identify incompatibilities between the old code image and the new code image from version information (e.g., Sec. 2.2 Requirements for the PJama Evolution Technology, 2nd Para - ... Another approach is called versioning ... for which the common feature is long-term coexistence of multiple versions of either individual classes, or collections of classes (schemas), and/or instances in the formats corresponding to these different versions; Sec. 2.6.1 General Approaches to Change Management; P. 46, step 6 - ... compare its old and new versions ...)
- a bootstrap module, within the new code image, configured to reconcile incompatibilities by changing an initialization order (e.g., Sec. 2.1.3.3 Class Promotion, 5th Para – The only time of the static initializer of a class is called is when the (not yet persistent) class is loaded from the file system. If a class becomes persistent, its static initialiser is not called when a class is fetched from the store. Otherwise, its static fields would potentially be re-initialized and their values could become inconsistent with the state of the persistent instances of that class ...; NOTE: Talati also teaches changing an initialization order (e.g., [0011]; [0042])) and converting a format of a data structure of the old code image

to a format compatible with a data structure of the new code image (e.g., Sec. 1.2.3 Evolution of Persistent Objects, 1st Para - ... the 'technology' of writing an application that saves a persistent object collection in some custom format ... This intermediate representation should then be re-read by another application that uses new class definitions and creates the matching persistent collection in the new format ...; last Para - ... a really adequate conversion technology should allow ... to perform arbitrary transformations of objects and larger data structures that embrace them ...; Sec. 2.2 Requirements for the PJama Evolution Technology, step 2 – For each changed class, check if the format of instances that it defines became different. If so, perform conversion of instances of this class ...)

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Dmitriev into the Talati-APA's system to further provide other limitations stated above in the Talati-APA system.

The motivation is that it would further enhance the Talati-APA's system by taking, advancing and/or incorporating the Dmitriev's system which offers significant advantages that a technology that supports runtime evolution of Java® applications was developed for the HotSpot production JVM; and, it allows the developers to redefine classes on-the-fly in the running JVM, and, unlike the only other existing similar system for java®, supports redefinition of classes that have methods currently active as once suggested by Dmitriev (i.e. Sec. 1.3 Thesis Statement, 3rd Para)

5. **As to claim 2** (original) (incorporating the rejection in claim 1), Talati discloses the apparatus wherein the old code image is updated substantially concurrent with normal execution of transactions by the apparatus (e.g., [0006]; [0008], lines 5-12; [0011])

6. **As to claim 3** (Currently Amended) (incorporating the rejection in claim 1), Talati discloses the apparatus, the executable code further comprising an initialization module configured to initiate execution of a run-time segment of the new code image (e.g., [0014])

7. **As to claim 7** (Currently Amended) (incorporating the rejection in claim 1), Talati discloses the bootstrap module is further configured to reconcile incompatibilities by associating the persistent data of the old code image with the new code image such that the persistent data is available in response to execution of the run-time segment of the new code image (e.g., [0012] – the conversion module provides two separate functionalities (a) to selectively reconcile incompatibilities between the old code image and the new code image cited in claim 1; and, (b) to recognize persistent data described in this claim)

8. **As to claim 9** (Currently Amended) (incorporating the rejection in claim 1), Dmitriev discloses the apparatus wherein identifying incompatibilities comprises identifying a difference between the format of the data structures used by the old code image and the format compatible with the data structures used by the new code image

(e.g., Sec. 2.2 Requirements for the PJama Evolution Technology, step 2 – For each changed class, check if the format of instances that it defines became different. If so, perform conversion of instances of this class ...)

9. **As to claim 10** (Currently Amended), Talati discloses an apparatus for updating a code image (e.g., Fig. 2, copier copies new code), comprising:

a processor executing executable code stored on a storage device, the executable code comprising (e.g., Fig. 1, element 106 – Processor)

- an update module configured to load a new code image (e.g., [0014], lines 2-3; Fig. 2, element 102; [0047], lines 1-2) into a temporary memory location (e.g., Fig. 1, element 108; [0009], line 2, staging area) separate from a memory space occupied by and used by an old code image (e.g., Fig. 2, elements 218, 110; [0046], lines 1-8) and a bootstrap module within the new code image that executes subsequent to the update module (e.g., Fig. 2, element 202; [0047], lines 1-2)

Further, Talati discloses a method and apparatus for downloading a new version of an executable code onto a system without the need to bring the system to a halt, thereby sacrificing system up time (e.g., [0005]) but does not explicitly disclose other limitations stated below.

However, APA discloses:

- a logic module configured to identify incompatibilities between the old code image and the new code image from a difference in initialization requirements (e.g., paragraph [007] on page 2 - ... changes in initialization processes for

various hardware ...), and a difference in size and location between the old code image and the new code image (e.g., paragraph [007] on page 2 - ... changes in ... formats for data structures, parameters used to interact with other modules of a computer system, maintenance of persistent data, updating of other dependent code images, and the like ...);

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of APA into the Talati's system to further provide other limitations stated above in the Talati system.

The motivation is that the changes may be made to resolve resource conflicts, comply with updated communication protocols, resolve coding errors, and add improved functionality; failure to make these changes can cause the new code image to be incompatible with other software and hardware components of the computer system as once suggested by APA (e.g., paragraph [007] on page 2)

Furthermore, Talati and APA do not explicitly disclose other limitations stated below.

However, in an analogous art of *Safe Class and Data Evolution in Large and Long-Lived Data Applications*, Dmitriev discloses:

- a logic module configured to identify incompatibilities between the old code image and the new code image from version information (e.g., Sec. 2.2 Requirements for the PJama Evolution Technology, 2nd Para - ... Another approach is called versioning ... for which the common feature is long-term coexistence of multiple versions of either individual classes, or collections of classes (schemas), and/or instances in the formats corresponding to these

- different versions; Sec. 2.6.1 General Approaches to Change Management; P. 46, step 6 - ... compare its old and new versions ...)
- the bootstrap module configured to reconcile incompatibilities by changing an initialization order (e.g., Sec. 2.1.3.3 Class Promotion, 5th Para – The only time of the static initializer of a class is called is when the (not yet persistent) class is loaded from the file system. If a class becomes persistent, its static initialiser is not called when a class is fetched from the store. Otherwise, its static fields would potentially be re-initialized and their values could become inconsistent with the state of the persistent instances of that class ...) and converting a data structure of the old code image to a format compatible with a data structure of the new code image Sec. 1.2.3 Evolution of Persistent Objects, 1st Para - ... the 'technology' of writing an application that saves a persistent object collection in some custom format ... This intermediate representation should then be re-read by another application that uses new class definitions and creates the matching persistent collection in the new format ...; last Para - ... a really adequate conversion technology should allow ... to perform arbitrary transformations of objects and larger data structures that embrace them ...; Sec. 2.2 Requirements for the PJama Evolution Technology, step 2 – For each changed class, check if the format of instances that it defines became different. If so, perform conversion of instances of this class ...) prior to copying the new code image into the memory space occupied by the old code image;

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Dmitriev into the Talati-APA's system to further provide other limitations stated above in the Talati-APA system.

The motivation is that it would further enhance the Talati-APA's system by taking, advancing and/or incorporating the Dmitriev's system which offers significant advantages that a technology that supports runtime evolution of Java® applications was developed for the HotSpot production JVM; and, it allows the developers to redefine classes on-the-fly in the running JVM, and, unlike the only other existing similar system for java®, supports redefinition of classes that have methods currently active as once suggested by Dmitriev (i.e. Sec. 1.3 Thesis Statement, 3rd Para)

10. **As to claim 12** (Currently Amended) (incorporating the rejection in claim 10), please refer to claim **9** above, accordingly.

11. **As to claim 13** (Currently Amended), Talati discloses a system that overlays an old code image with a new code image with minimal interruption of operations being performed by execution of the old code image (e.g., [0011]), the system comprising:

- a memory comprising an old code image (e.g., Fig. 1, element 110; Fig. 2, element 108) and a buffer (e.g., Fig. 1, element 108; Fig. 2, element 110) configured to store a new code image;
- a processor executing instructions of the old code image to perform one or more operations (e.g., Fig. 1, element 106), the processor configured to execute

instructions of the old code image and the new code image (e.g., [0011]; [0032], lines 1-5);

- the memory further storing a pointer data structure configured to store an old code image pointer (e.g., Fig. 2, elements 204, 208, and 212; [0023], lines 4-10) and a new code image pointer (e.g., Fig. 2, elements 206, 210, and 214; [0023], lines 11-16);
- wherein, in response to an interrupt, the processor begins executing bootstrap code within the new code image (e.g., [0040])

Further, Talati discloses a method and apparatus for downloading a new version of an executable code onto a system without the need to bring the system to a halt, thereby sacrificing system up time (e.g., [0005]) but does not explicitly disclose other limitations stated below.

However, APA discloses:

- identifying incompatibilities between the old code image and the new code image from a difference in initialization requirements (e.g., paragraph [007] on page 2 - ... changes in initialization processes for various hardware ...), and a difference in size and location between the old code image and the new code image (e.g., paragraph [007] on page 2 - ... changes in ... formats for data structures, parameters used to interact with other modules of a computer system, maintenance of persistent data, updating of other dependent code images, and the like ...)

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of APA into the Talati's system to further provide other limitations stated above in the Talati system.

The motivation is that the changes may be made to resolve resource conflicts, comply with updated communication protocols, resolve coding errors, and add improved functionality; failure to make these changes can cause the new code image to be incompatible with other software and hardware components of the computer system as once suggested by APA (e.g., paragraph [007] on page 2)

Furthermore, Talati and APA do not explicitly disclose other limitations stated below.

However, in an analogous art of *Safe Class and Data Evolution in Large and Long-Lived Data Applications*, Dmitriev discloses:

- identifying incompatibilities between the old code image and the new code image from version information (e.g., Sec. 2.2 Requirements for the PJama Evolution Technology, 2nd Para - ... Another approach is called versioning ... for which the common feature is long-term coexistence of multiple versions of either individual classes, or collections of classes (schemas), and/or instances in the formats corresponding to these different versions; Sec. 2.6.1 General Approaches to Change Management; P. 46, step 6 - ... compare its old and new versions ...)
- the bootstrap code configured to reconcile incompatibilities between the old code image and the new code image by changing an initialization order (e.g., Sec. 2.1.3.3 Class Promotion, 5th Para – The only time of the static initializer

of a class is called is when the (not yet persistent) class is loaded from the file system. If a class becomes persistent, its static initialiser is not called when a class is fetched from the store. Otherwise, its static fields would potentially be re-initialized and their values could become inconsistent with the state of the persistent instances of that class ...) and converting a data structure of the old code image to a format compatible with a data structure of the new code image (e.g., Sec. 1.2.3 Evolution of Persistent Objects, 1st Para - ... the 'technology' of writing an application that saves a persistent object collection in some custom format ... This intermediate representation should then be re-read by another application that uses new class definitions and creates the matching persistent collection in the new format ...; last Para - ... a really adequate conversion technology should allow ... to perform arbitrary transformations of objects and larger data structures that embrace them ...; Sec. 2.2 Requirements for the PJama Evolution Technology, step 2 – For each changed class, check if the format of instances that it defines became different. If so, perform conversion of instances of this class ...)

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Dmitriev into the Talati-APA's system to further provide other limitations stated above in the Talati-APA system.

The motivation is that it would further enhance the Talati-APA's system by taking, advancing and/or incorporating the Dmitriev's system which offers significant advantages that a technology that supports runtime evolution of Java® applications was

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developed for the HotSpot production JVM; and, it allows the developers to redefine classes on-the-fly in the running JVM, and, unlike the only other existing similar system for java®, supports redefinition of classes that have methods currently active as once suggested by Dmitriev (i.e. Sec. 1.3 Thesis Statement, 3rd Para)

12. **As to claim 20** (Currently Amended), Talati discloses a method for updating a code image (e.g., Fig. 2, Copier copies new code), comprising:

- loading a new code image into a temporary memory location (e.g., Fig. 1, element 108; [0009], staging area) separate from a memory space (e.g., Fig. 1, element 110; [0009], line 2, runtime area) occupied by and used by an old code image (e.g., Fig. 2, elements 218, 110; [0046], lines 1-8; [0047], lines 1-2);
- copying the new code image into the memory space occupied by the old code image (e.g., Fig. 2, element 202; Fig. 3, element 302)

Further, Talati discloses a method and apparatus for downloading a new version of an executable code onto a system without the need to bring the system to a halt, thereby sacrificing system up time (e.g., [0005]) but does not explicitly disclose other limitations stated below.

However, APA discloses:

- identifying incompatibilities between the old code image and the new code image from a difference in initialization requirements (e.g., paragraph [007] on page 2 - ... changes in initialization processes for various hardware ...), and a difference in size and location (e.g., paragraph [007] on page 2 - ... changes

in ... formats for data structures, parameters used to interact with other modules of a computer system, maintenance of persistent data, updating of other dependent code images, and the like ...) between the old code image and the new code image;

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of APA into the Talati's system to further provide other limitations stated above in the Talati system.

The motivation is that the changes may be made to resolve resource conflicts, comply with updated communication protocols, resolve coding errors, and add improved functionality; failure to make these changes can cause the new code image to be incompatible with other software and hardware components of the computer system as once suggested by APA (e.g., paragraph [007] on page 2)

Furthermore, Talati and APA do not explicitly disclose other limitations stated below.

However, in an analogous art of *Safe Class and Data Evolution in Large and Long-Lived Data Applications*, Dmitriev discloses:

- identifying incompatibilities between the old code image and the new code image from version information (e.g., Sec. 2.2 Requirements for the PJama Evolution Technology, 2nd Para - ... Another approach is called versioning ... for which the common feature is long-term coexistence of multiple versions of either individual classes, or collections of classes (schemas), and/or instances in the formats corresponding to these different versions; Sec. 2.6.1

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- General Approaches to Change Management; P. 46, step 6 - ... compare its old and new versions ...)
- reconciling incompatibilities by changing an initialization order (e.g., Sec. 2.1.3.3 Class Promotion, 5th Para – The only time of the static initializer of a class is called is when the (not yet persistent) class is loaded from the file system. If a class becomes persistent, its static initialiser is not called when a class is fetched from the store. Otherwise, its static fields would potentially be re-initialized and their values could become inconsistent with the state of the persistent instances of that class ...) and converting a data structure of the old code image to a format compatible with a data structure of the new code image using bootstrap code of the new code image (e.g., Sec. 1.2.3 Evolution of Persistent Objects, 1st Para - ... the 'technology' of writing an application that saves a persistent object collection in some custom format ... This intermediate representation should then be re-read by another application that uses new class definitions and creates the matching persistent collection in the new format ...; last Para - ... a really adequate conversion technology should allow ... to perform arbitrary transformations of objects and larger data structures that embrace them ...; Sec. 2.2 Requirements for the PJama Evolution Technology, step 2 – For each changed class, check if the format of instances that it defines became different. If so, perform conversion of instances of this class ...)

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Dmitriev into the Talati-APA's system to further provide other limitations stated above in the Talati-APA system.

The motivation is that it would further enhance the Talati-APA's system by taking, advancing and/or incorporating the Dmitriev's system which offers significant advantages that a technology that supports runtime evolution of Java® applications was developed for the HotSpot production JVM; and, it allows the developers to redefine classes on-the-fly in the running JVM, and, unlike the only other existing similar system for java®, supports redefinition of classes that have methods currently active as once suggested by Dmitriev (i.e. Sec. 1.3 Thesis Statement, 3rd Para)

13. **As to claim 21** (original) (incorporating the rejection in claim 20), Talati discloses the method wherein the old code image is updated substantially concurrently with execution of regular computer operations (e.g., [0011]; [0014])

14. **As to claim 22** (original) (incorporating the rejection in claim 20), Talati discloses the method further comprising initiating execution of a run-time segment of the new code image (e.g., [0049])

15. **As to claim 26** (Previously Presented) (incorporating the rejection in claim 20), Talati discloses the method, wherein reconciling the incompatibilities further comprises associating persistent data of with the old code image with the new code image, such

that the persistent data is available in response to execution of a run-time segment of the new code image (e.g., [0011]; [0012])

16. **As to claim 28** (Currently Amended) (incorporating the rejection in claim 20), please refer to claim **9** above, accordingly.

17. **As to claim 29** (Currently Amended), Talati discloses an apparatus for updating a code image (e.g., [0014], lines 2-3; Fig. 2, copier copies new code; [0047], lines 1-2), the apparatus comprising:

a processor executing executable code stored on a storage device, the executable code comprising (e.g., Fig. 1, element 106 – Processor)

- means for loading a new code image (e.g., Fig. 2, element 102) into a temporary memory location (e.g., Fig. 1, element 108; [0009], staging area) separate from a memory space (e.g., Fig. 1, element 110) occupied by and used by an old code image;
- means for copying the new code image into the memory space occupied by the old code image (e.g., Fig. 2, element 202; Fig. 3, element 302)

Further, Talati discloses a method and apparatus for downloading a new version of an executable code onto a system without the need to bring the system to a halt, thereby sacrificing system up time (e.g., [0005]) but does not explicitly disclose other limitations stated below.

However, APA discloses:

- means for identifying incompatibilities between the old code image and the new code image from a difference in initialization requirements (e.g., paragraph [007] on page 2 - ... changes in initialization processes for various hardware ...), and a difference in size and location between the old code image and the new code image (e.g., paragraph [007] on page 2 - ... changes in ... formats for data structures, parameters used to interact with other modules of a computer system, maintenance of persistent data, updating of other dependent code images, and the like ...);

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of APA into the Talati's system to further provide other limitations stated above in the Talati system.

The motivation is that the changes may be made to resolve resource conflicts, comply with updated communication protocols, resolve coding errors, and add improved functionality; failure to make these changes can cause the new code image to be incompatible with other software and hardware components of the computer system as once suggested by APA (e.g., paragraph [007] on page 2)

Furthermore, Talati and APA do not explicitly disclose other limitations stated below.

However, in an analogous art of *Safe Class and Data Evolution in Large and Long-Lived Data Applications*, Dmitriev discloses:

- means for identifying incompatibilities between the old code image and the new code image from version information (e.g., Sec. 2.2 Requirements for the PJama Evolution Technology, 2nd Para - ... Another approach is called

- versioning ... for which the common feature is long-term coexistence of multiple versions of either individual classes, or collections of classes (schemas), and/or instances in the formats corresponding to these different versions; Sec. 2.6.1 General Approaches to Change Management; P. 46, step 6 - ... compare its old and new versions ...)
- means for reconciling the incompatibilities by changing an initialization order (e.g., Sec. 2.1.3.3 Class Promotion, 5th Para – The only time of the static initializer of a class is called is when the (not yet persistent) class is loaded from the file system. If a class becomes persistent, its static initialiser is not called when a class is fetched from the store. Otherwise, its static fields would potentially be re-initialized and their values could become inconsistent with the state of the persistent instances of that class ...) and converting a format of a data structure of the old code image to a format compatible with a data structure of the new code image using bootstrap code of the new code image (e.g., Sec. 1.2.3 Evolution of Persistent Objects, 1st Para - ... the 'technology' of writing an application that saves a persistent object collection in some custom format ... This intermediate representation should then be re-read by another application that uses new class definitions and creates the matching persistent collection in the new format ...; last Para - ... a really adequate conversion technology should allow ... to perform arbitrary transformations of objects and larger data structures that embrace them ...; Sec. 2.2 Requirements for the PJama Evolution Technology, step 2 – For each

changed class, check if the format of instances that it defines became different. If so, perform conversion of instances of this class ...)

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Dmitriev into the Talati-APA's system to further provide other limitations stated above in the Talati-APA system.

The motivation is that it would further enhance the Talati-APA's system by taking, advancing and/or incorporating the Dmitriev's system which offers significant advantages that a technology that supports runtime evolution of Java® applications was developed for the HotSpot production JVM; and, it allows the developers to redefine classes on-the-fly in the running JVM, and, unlike the only other existing similar system for java®, supports redefinition of classes that have methods currently active as once suggested by Dmitriev (i.e. Sec. 1.3 Thesis Statement, 3rd Para)

18. **As to claim 30** (Currently Amended), Talati discloses an article of manufacture comprising a program storage medium readable by a processor and embodying one or more instructions executable by a processor to perform a method for updating a code image (e.g., Fig. 1), the method comprising:

- loading a new code image into a temporary memory location separate from a memory space occupied by and used by an old code image (e.g., Fig. 2, elements 218, 110; [0046], lines 1-8; [0047], lines 1-2);
- copying the new code image into the memory space occupied by the old code image (e.g., Fig. 2, element 202; Fig. 3, element 302)

Further, Talati discloses a method and apparatus for downloading a new version of an executable code onto a system without the need to bring the system to a halt, thereby sacrificing system up time (e.g., [0005]) but does not explicitly disclose other limitations stated below.

However, APA discloses:

- identifying incompatibilities between the old code image and the new code image from a difference in initialization requirements (e.g., paragraph [007] on page 2 - ... changes in initialization processes for various hardware ...), and a difference in size and location between the old code image and the new code image (e.g., paragraph [007] on page 2 - ... changes in ... formats for data structures, parameters used to interact with other modules of a computer system, maintenance of persistent data, updating of other dependent code images, and the like ...);

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of APA into the Talati's system to further provide other limitations stated above in the Talati system.

The motivation is that the changes may be made to resolve resource conflicts, comply with updated communication protocols, resolve coding errors, and add improved functionality; failure to make these changes can cause the new code image to be incompatible with other software and hardware components of the computer system as once suggested by APA (e.g., paragraph [007] on page 2)

Furthermore, Talati and APA do not explicitly disclose other limitations stated below.

However, in an analogous art of *Safe Class and Data Evolution in Large and Long-Lived Data Applications*, Dmitriev discloses:

- identifying incompatibilities between the old code image and the new code image from version information (e.g., Sec. 2.2 Requirements for the PJama Evolution Technology, 2nd Para - ... Another approach is called versioning ... for which the common feature is long-term coexistence of multiple versions of either individual classes, or collections of classes (schemas), and/or instances in the formats corresponding to these different versions; Sec. 2.6.1 General Approaches to Change Management; P. 46, step 6 - ... compare its old and new versions ...)
- reconciling the incompatibilities by changing an initialization order (e.g., Sec. 2.1.3.3 Class Promotion, 5th Para – The only time of the static initializer of a class is called is when the (not yet persistent) class is loaded from the file system. If a class becomes persistent, its static initialiser is not called when a class is fetched from the store. Otherwise, its static fields would potentially be re-initialized and their values could become inconsistent with the state of the persistent instances of that class ...) and converting a format of a data structure of the old code image to a format compatible with a data structure of the new code image using bootstrap code of the new code image (e.g., Sec. 1.2.3 Evolution of Persistent Objects, 1st Para - ... the 'technology' of writing an application that saves a persistent object collection in some custom format ... This intermediate representation should then be re-read by another

application that uses new class definitions and creates the matching persistent collection in the new format ...; last Para - ... a really adequate conversion technology should allow ... to perform arbitrary transformations of objects and larger data structures that embrace them ...; Sec. 2.2 Requirements for the PJama Evolution Technology, step 2 – For each changed class, check if the format of instances that it defines became different. If so, perform conversion of instances of this class ...)

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Dmitriev into the Talati-APA's system to further provide other limitations stated above in the Talati-APA system.

The motivation is that it would further enhance the Talati-APA's system by taking, advancing and/or incorporating the Dmitriev's system which offers significant advantages that a technology that supports runtime evolution of Java® applications was developed for the HotSpot production JVM; and, it allows the developers to redefine classes on-the-fly in the running JVM, and, unlike the only other existing similar system for java®, supports redefinition of classes that have methods currently active as once suggested by Dmitriev (i.e. Sec. 1.3 Thesis Statement, 3rd Para)

19. **As to claim 31** (New) (incorporating the rejection in claim 1), APA discloses the apparatus, wherein identifying incompatibilities between the old code image and the new code image further comprises accessing capability information for the old code image and capability information for the new code image and identifying a difference

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between the capability information (e.g., paragraph [007] on page 2 - ... including changes in parameter lists ... The changes may be made to resolve resource conflicts, comply with updated communication protocols ...) and Dmitriev discloses wherein reconciling incompatibilities between the old code image and the new code image further comprises adjusting configuration settings and parameter lists (e.g., Sec. 1.2.5 - Runtime Evolution of Java Applications, 1st Para - ... used to fine-tune the code for e.g. specific hardware configurations or security requirements ...; Sec. 7.6.2 – Load-Time Transformation, 1st Para - ... to optimize or reconfigure applications by generating specialized classes ...)

20. **As to claim 32** (New) (incorporating the rejection in claim 10), please refer to claim **31** above, accordingly.

21. **As to claim 33** (New) (incorporating the rejection in claim 13), please refer to claim **31** above, accordingly.

22. **As to claim 34** (New) (incorporating the rejection in claim 20), please refer to claim **31** above, accordingly.

23. **As to claim 35** (New) (incorporating the rejection in claim 30), please refer to claim **31** above, accordingly.

24. Claim 11 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talati in view of APA, Dmitriev and E. Schwabe (Pat. No. US 6,986,132 B1) (hereinafter 'Schwabe')

25. **As to claim 11** (Previously Presented) (incorporating the rejection in claim 10), Talati, APA and Dmitriev do not disclose the limitations stated below.

However, in an analogous art of *Remote Incremental Program Binary Compatibility Verification Using API Definitions*, Schwabe discloses the apparatus wherein the bootstrap module comprises a conversion module configured to reconcile the incompatibilities base on the version information for the old code image and the new code image and a copy module configured to copy the new code image over the old code image in response to reconciliation of the incompatibilities (e.g., Fig. 17, element 1440 – version; Fig. 18, element 1470 – version; Fig. 19, element 1515 – verify version of API definition file used during verification is compatible with version of referenced binary file; Fig. 20A – 3. verify backward compatible version with content; Fig. 20C – verify versions using API definitions files, elements of 1600, 1605, and 1610)

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Schwabe into the Talati-APA-Dmitriev's system to further provide the limitations stated above in the Talati-APA-Dmitriev system.

The motivation is that use of the verifier enables verification of a program's integrity and allows the use of an interpreter that does not execute the usual stack monitoring instructions during program execution, thereby greatly accelerating the

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program interpretation process as once suggested by Schwabe (i.e. Col. 13, Line 66 through Col. 14, Line 8)

26. **As to claim 23** (Previously Presented) (incorporating the rejection in claim 20), Schwabe discloses the method wherein the new code image is not copied into the memory space until incompatibilities are reconciled (e.g., Col. 5, Lines 49-53; Col. 10, Lines 40-44; Col. 11, Line 58 through Col. 12, Lines 6; Figs. 15A-15B; Col. 20, Line 64 through Col. 21, Line 4, 14-20; Fig. 17; Col. 22, Lines 4-16; Figs. 20A-20D; Col. 24, Lines 24-32)

27. **As to claim 24** (Previously Presented) (incorporating the rejection in claim 20), Schwabe discloses the method, wherein identifying incompatibilities between the old code image and the new code image further comprises accessing capability information for the old code image and capability information for the new code image and identifying an incompatibility based at least in part on a difference between the capability information (e.g., Col. 9, Lines 6-11)

28. **As to claim 25** (Previously Presented) (incorporating the rejection in claim 24), Schwabe discloses the method, wherein reconciling the incompatibilities comprising updating modules that interface with the new code image based at least in part on a difference between the capability information (e.g., Col. 9, Lines 6-11)

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29. Claim 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talati in view of APA, Dmitriev and Hiller (Pat. No. US 6,658,659 B2) (hereinafter 'Hiller')

30. **As to claim 14** (original) (incorporating the rejection in claim 13), Talati, APA, and Dmitriev do not disclose the limitations stated below.

However, in an analogous art of *Compatible Version Module Loading*, Hiller discloses the system wherein the bootstrap code overlays the new code image in memory with the old code image in response to reconciliation of the incompatibilities (e.g., Fig. 2A, element 206; Fig. 2B; Col. 3, Lines 42-46; Col. 4, Lines 64-67))

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Hiller into the Talati-APA-Dmitriev's system to further provide the limitations stated above in the Talati- Dmitriev system.

The motivation is that the system wherein the version aware bootstrap code will check and ensure that loaded software modules are compatible with one another and will therefore execute properly as once suggested by Hill (i.e. Abstract, Lines 10-13)

31. **As to claim 15** (original) (incorporating the rejection in claim 14), Talati discloses the system wherein in response to the interrupt, the processor executes an update module of the old code image that loads the new code image into the buffer (e.g., Fig. 3, step 302; [0040]; [0041])

32. **As to claim 16** (original) (incorporating the rejection in claim 15), Talati discloses the system wherein the update module stores the old code image pointer (e.g., Fig. 2, elements 204, 208, and 212; [0023], lines 4-10) and the new code image pointer (e.g., Fig. 2, elements 206, 210, and 214; [0023], lines 11-16) in the data structure.

33. **As to claim 17** (original) (incorporating the rejection in claim 16), Talati discloses the system of wherein the update module reads a new code image header identified by the new code image pointer (e.g., Fig. 2, elements 206, 210; [0034]) to determine the location of the bootstrap code within the new code image (e.g., [0037], lines 5-7)

34. Claim 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talati in view of APA, Dmitriev, Hiller, and Schwabe.

35. **As to claim 18** (Previously Presented) (incorporating the rejection in claim 17), Talati, APA, Dmitriev and Hiller do not disclose the limitations stated below.

However, in an analogous art of *Remote Incremental Program Binary Compatibility Verification Using API Definitions*, Schwabe discloses the system, wherein the bootstrap code further reconciles the incompatibilities by updating modules that interface with the new code image (e.g., Col. 9, Lines 6-11)

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Schwabe into the Talati-APA-

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Dmitriev-Hiller's system to further provide the limitations stated above in the Talati-APA-Dmitriev-Hiller system.

The motivation is that use of the verifier enables verification of a program's integrity and allows the use of an interpreter that does not execute the usual stack monitoring instructions during program execution, thereby greatly accelerating the program interpretation process as once suggested by Schwabe (i.e. Col. 13, Line 66 through Col. 14, Line 8)

36. **As to claim 19** (Previously Presented) (incorporating the rejection in claim 18), Schwabe discloses the system wherein the bootstrap code further reconciles the incompatibilities by associating persistent data of the old code image with the new code image (e.g., Fig. 17, element 1440 – version; Fig. 18, element 1470 – version; Fig. 19, element 1515 – verify version of API definition file used during verification is compatible with version of referenced binary file; Fig. 20A – 3. verify backward compatible version with content; Fig. 20C – verify versions using API definitions files, elements of 1600, 1605, and 1610)

Conclusion

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben C. Wang whose telephone number is 571-270-1240. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on 571-272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ben C Wang/

Ben C. Wang

Examiner, Art Unit 2192

/Tuan Q. Dam/

Supervisory Patent Examiner, Art Unit 2192